

5(4)

SOV/20-122-3-25/57

AUTHORS: Zhdanov, S. I., Frumkin, A. N., Academician

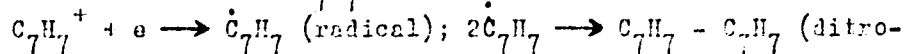
TITLE: The Polarography of the Tropylium Ion (Polyarografiya iona tropiliya)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol 122, Nr 3, pp 412-415 (USSR)

ABSTRACT: The polarogram of the tropylium ion ($C_7H_7^+$) on the background of LiCl contains 3 waves the third of which ($\phi_{1/2} \sim -1,5$ V) corresponds to the discharge of H^+ ions produced by the hydrolysis of the tropylium salt. This paper deals with the nature of the other waves. Tropylium perchlorate was used as initial material for these investigations.

For $[C_7H_7^+] < 3 \cdot 10^{-4}$ M, the polarogram contains only the first wave with $\phi_{1/2} \sim -0,30$ V. The following mechanism of the restoration of $C_7H_7^+$ is the most probable one:

Card 1/3



The Polarography of the Tropylium Ion

SOV/20-122-3-25/57

pylium). This conclusion is confirmed also by the results of other papers (Ref 2). According to the comparison of the polarization curve and of the electrocapillary curve of tropylium, the $C_7H_7^+$ ions are reduced in the adsorbed state.

Under such conditions, the discharge of the tropylium ion is an analogon to the discharge of metallic cations, which are attached to a metal lattice. The increase of the first wave stops if $[C_7H_7^+] \sim 3 \cdot 10^{-4}$ M. A further increase of

$[C_7H_7^+]$ causes the occurrence of the second wave with

$\phi_{1/2} \sim -0,7$ V. For the potentials of the second wave, the

process remains a one-electron process. The properties of the adsorption waves of tropylium are essentially different from those of the Brdichka waves. Also the neutral molecules of some organic compounds and even cations (for instance, the very ions of tropylium at sufficiently high concentrations) have similar properties. Substances of lower surface tension which are adsorbed more intensely than ditropylium, prevent the formation of an adsorption layer of ditropylium. The authors thank M. Ye. Vol'pin who placed the preparation of tropylium perchlorate at their disposal. The electrocapillary curves

Card 2/3

The Polarography of the Tropylium Ion

SOV/20-122-3-25/57

(Fig 1) were plotted by M. A. Gerovich (deceased) and H. S. Polyanovskaya (Kafedra elektrokhemii Moskovskogo universiteta (Chair of Electrochemistry, Moscow University)). There are 4 figures and 17 references, 4 of which are Soviet.

SUBMITTED: July 19, 1950

Card 3/3

FRUMKIN, A. N.

"The Adsorption of Ions at the Metal-Solution Interface and Its Influence on Electrode Kinetics"

report to be submitted for the Session of the Theoretical Division of the Electrochemical Society - Spring Meeting, Philadelphia, 4-7 May 1959.
Abst. available E,3,128,664

Institute of Electrochemistry, Academy of Sciences of the USSR, Leninsky Prospekt
31, Moscow

FRUMKIN, A.N., akademik, otv.red.; YESIN, O.A., prof., red.; ZHDANOV, S.I., red.; KABANOV, B.N., prof., red.; KOLOTYRKIN, Ya.M., dokt.khim. nauk, red.; LOSEV, V.V., red.; LUKOVTSSEV, P.D., prof., red.; SOLOV'YEVA, Z.A., red.; STENDER, V.V., prof., red.; FLORIANOVICH, G.M., red.; YEGOROV, N.G., red.izd-va; PRUSAKOVA, T.A., tekhn.red.

[Proceedings of the 4th Conference on Electrochemistry, October 1-6, 1956] Trudy 4-go soveshchania po elektrokhimii, 1-6 oktiabria 1956 g. Moskva, Izd-vo Akad.nauk SSSR, 1959. 867 p. (MIRA 12:5)

1. Soveshchaniye po elektrokhimii, 4th, Moscow, 1956.
(Electrochemistry)

13(6)
Amended

222

Abstract

PHOTOGRAPHY

Shlander, P. A., Academician **SOV/JO-59-1-5/37**

At present, colloid chemistry plays an especially important part in political economy as it is a physical-chemical science concerning substances of modern engineering. It is of great practical importance that at present it is possible to carry on uninterrupted transitions from lyophobic to lyophilic systems. Thus, it is possible to obtain technologically important substances with the required physicochemical properties. The theory of highly molecular substances and their actions has developed into an independent branch of colloid chemistry. The validity of modern colloid chemistry is proved by the fact that it provides many new independent branches of science. Furthermore, the author describes the terms of the 4th All-Union Conference of Colloid Chemistry which took place in Tbilisi on May 1-16, 1960. It was organized by the Odesskoye Khimicheskoye

E. H. Retzmann (Elroy) reported on the present state of research in the field of colloid metal.

Dr. Mielucka (Bulgaria) determined theoretically and experimentally the regulation of synapses in fovea.

of elimination of water properties and structure of post by means of radioactive isotopes.

16. Electrostatic considered questions of adsorption and desorption of electrolytes in colloid dispersion systems.

ment of the electrostatic stability theory as well as the calculation of dispersion systems, and on the theory of formation and the properties of aerosols.

B. Eremov, A. B. Tikhonov reported on the role of the structural-mechanical barrier as a factor of precooling curves for a full stabilization of elements resistance.

57. A. Rodinder showed it in his investigations (Ref 1).

H. Dubinin and his pupils dedicated a series of researches to the improvement of the stabilizer in sufficient time and provision coverage of parties.

3. Freestria with collaborators examined new approaches of description in the theory of electrode processes.

A. Degradation. A. Ia. Kozlov discussed questions of adsorption of active fillers with polymers, as well as the chemical modification of them.

79. Bozalova, P. A. Schinder and collaborators reported on

H. Bortner showed that the appearance of black spherulitic structure in the hardening of mineral binding agents.

5. Palatnik (Dor'kev) examined the colloidal state of alloys in this film and massifs samples.

B. Shchepkin, V. P. Indina clarified the theoretical criterion of spontaneous dispersion of solid bodies, especially metals, in a magnetic field.

I. Kikhtman reported on the appearance of adsorptive stiffening of lead and tin at normal temperatures.

Technological properties of printing colors on their behavior in the printing process.

Salmonella reported on the regulation of crystallization
organization structures in the production of heat stable
beer.

5(4)

AUTHORS:

Frumkin, A. N., Aykazyan, E. A.

SOV/62-59-2-4/40

TITLE:

Kinetics of Ionization of Molecular Hydrogen on a Platinum Electrode (Kinetika ionizatsii molekulyarnogo vodoroda na platinovom elektrode)

PERIODICAL:

Izvestiya Akademii nauk SSSR. Otdeleniye khimicheskikh nauk, 1959, Nr 2, pp 202-213 (USSR)

ABSTRACT:

In the present paper the density of the ionization current of hydrogen was investigated in dependence on the overvoltage in solutions of 1N H_2SO_4 , 1N NaOH, 1N HCl, 1N HBr and 1N KJ + 0.1N HCl on a rotary (120 to 20,000 rotations per minute), disk-shaped, plain and platinized Pt electrode. The high rotation rate of the electrode made it possible to leave out the diffusion limitations and to reach a limit at which the ionization rate of hydrogen is determined by a kinetic stage. A kinetic inhibition occurs at low potential values and is the more pronounced the more intense the adsorption of anions is and the slower the potential is put on. At sufficient positive potentials the transition from the diffusion stage into the kinetic one takes place within a

Card 1/3

Kinetics of Ionization of Molecular Hydrogen on a
Platinum Electrode

SOV/62-59-2-4/40

very limited numerical range of the electrode rotations per second. This indicates that the order of magnitude of the reaction of hydrogen is near the zero potential. The results obtained can be interpreted by the assumption that only the active part of the surface, where the adsorption rate of H_2 reaches a sufficient magnitude, takes part in the electrochemical process. On the active part of the surface an adsorption equilibrium with molecular hydrogen is attained which corresponds to a considerable number of electrons. The rate of the summary process is determined by a certain stage which follows adsorption, e.g. by the ionization rate of the adsorbed hydrogen or by the surface diffusion of the atoms proceeding from the centers where adsorption takes place to those where ionization occurs. The adsorption of anions causes a reduction of the active part of the surface. There are 8 figures, 1 table, and 28 references, 14 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im M. V. Lomonosova
(Moscow State University imeni M. V. Lomonosov)

Card 2/3

5(4)

AUTHORS:

Frumkin, A. N., Academician,
Nekrasov, L. N.

SOV/20-126-1-31/62

TITLE:

A Rotating Disc and Ring Electrode (Okol'tsevom diskovom elektrode)

PERIODICAL:

Doklady Akademii nauk SSSR, 1959, Vol 126, Nr 1, pp 115-118
(USSR)

ABSTRACT:

A method of investigating intermediate- and final products (stable and non-stable products) of electrochemical reactions by means of a rotating electrode consisting of two platinum- or gold electrodes located in the same plane, one of which is disk-shaped and the other annular, is described. The space between disk and ring is filled by insulation material. The product formed by electrolytic processes on the disk electrode can be fixed by reduction or oxidation on the ring electrode. The initial and the final product of the reaction must, however, not enter into reaction on the ring within that potential interval within which the reduction (oxidation) of the investigated intermediate product takes place. This combined ring-disk electrode is shown by figure 1. The method and the checking of the theoretical formulas by Yu. B. Ivanov and V. G. Levich (Ref 2) was carried out by

Card 1/2

A Rotating Disc and Ring Electrode

SOV/20-126-1-31/62

plotting the polarization curves of the reduction of quinone (Fig 2) and of oxygen. The polarization curve of the cathodic reduction of oxygen on an amalgamated gold disk electrode and the dependence of the diffusion current of the oxidation of H_2O_2 on the ring electrode on the potential of the disk electrode are shown by figure 3. The polarization curve has two waves. In the first, H_2O_2 is the stable product, and in the second H_2O_2 is the intermediate product. In order to avoid passivation of the gold electrode, the potential had to be increased rapidly (2.5 v/min). In the case of too slow a measurement of the polarization curves, passivation occurs, and the process is no longer limited by the diffusion factors but by kinetic factors. There are 4 figures and 2 Soviet references.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova
(Moscow State University imeni M. V. Lomonosov)

SUBMITTED: March 3, 1959
Card 2/2

66187

SOV/20-128-5-41/67

5(4)

5.1310

AUTHORS:

Frumkin, A. N., Academician, Petriy, O. A.,
Nikolayeva-Fedbrovich, N. V.

TITLE:

The Mechanism of Electroreduction of the $\text{Fe}(\text{CN})_6^{3-}$ -Anion on a Mercury Drop Electrode

PERIODICAL:

Doklady Akademii nauk SSSR, 1959, Vol 128, Nr 5, pp 1006-1009 (USSR)

ABSTRACT:

A. N. Frumkin and G. M. Florianovich (Ref 1) derived an equation which permitted calculation of the course of reduction of the $\text{S}_2\text{O}_8^{2-}$ -anion at various KCl concentrations. Unlike this reaction, reaction rate did not rise with $\text{Fe}(\text{CN})_6^{3-}$ when the negative potential continued to rise and the reaction had attained its minimum. According to the assumptions made by V. G. Levich (Refs 2, 3), retarded penetration of the anion into the double layer could be assumed here. The reduction of $\text{Fe}(\text{CN})_6^{3-}$ on a mercury drop electrode was investigated in detail. An ordinary polarization curve is obtained from $\text{Fe}(\text{CN})_6^{3-}$ in a 10^{-3} N solution of $\text{K}_3\text{Fe}(\text{CN})_6$ in the

Card 1/4

66187

The Mechanism of Electroreduction of the $\text{Fe}(\text{CN})_6^{3-}$ -Anion SOV/20-128-5-41/67
on a Mercury Drop Electrode

presence of a $3 \cdot 10^{-2}$ N solution of KCl (Fig 1). The limit current may be measured according to Il'kovich's equation. Amperage drops within the range of the zero-charge potential when the electrolyte concentration is reduced. The amperage attains a minimum at $-1,2$ v and does not change any longer even at more negative potentials.

The same behavior was shown by $2 \cdot 10^{-3}$ N and $3 \cdot 10^{-3}$ N solutions of $\text{K}_3\text{Fe}(\text{CN})_6$ as well as by the corresponding Cs- and Li-salts in a concentration of 10^{-3} N. To determine the dependence of

reduction rate of $\text{Fe}(\text{CN})_6^{3-}$ on the potential, corrections were made for the polarization curves according to the equation of the theory of concentration polarization for first-order reactions on the drop electrode by N. N. Meyman and V. S. Bagotskiy (Ref 8). Calculations indicate that with increasing polarization the reduction rate should have risen by 30-40% as soon as it had attained its minimum (Fig 2). The lack of this rise on experimental curves is explained by the fact that with increasing cathode potential, the reduction rate of the anion rises but slowly, and that with increasing negative surface charge, dropping time and

✓

Card 2/4

66187

The Mechanism of Electrodereduction of the $\text{Fe}(\text{CN})_6^{3-}$ -Anion on a Mercury Drop Electrode SOV/20-128-5-41/67

drop surface diminish considerably. In the presence of KCl, CaCl, and LiCl, the reduction rate of $\text{Fe}(\text{CN})_6^{3-}$ is always proportional to the 3.0-to 3.2th power of the cation concentration. When Cs^+ is substituted for K^+ in the same concentration, the reduction rate of $\text{Fe}(\text{CN})_6^{3-}$ quadruples. The temperature coefficient of $\text{Fe}(\text{CN})_6^{3-}$ -reduction is positive. In the presence of negative surface charge, an increase in the background-ion charges results in decreasing reduction rate of $\text{Fe}(\text{CN})_6^{3-}$ in the following order:

$\text{Cl}^- < \text{SO}_4^{2-} < \text{Fe}(\text{CN})_6^{4-}$ (Fig 3). The adsorbable halogen ions

$\text{Cl}^- < \text{Br}^- < \text{I}^-$, however, increase the reduction rate of $\text{S}_2\text{O}_8^{2-}$, but

do not affect the reaction of $\text{Fe}(\text{CN})_6^{3-}$. The organic cations

$[(\text{CH}_3)_4\text{N}]^+$, $[(\text{C}_2\text{H}_5)_4\text{N}]^+$, $[(\text{C}_4\text{H}_9)_4\text{N}]^+$, $[(\text{C}_5\text{H}_{11})_4\text{N}]^+$ and $[(\text{C}_6\text{H}_{13})_4\text{N}]^+$

increase the reduction rate of $\text{Fe}(\text{CN})_6^{3-}$. Their effect is

Card 3/4

66187

The Mechanism of Electrodereduction of the $\text{Fe}(\text{CN})_6^{3-}$ -Anion on a Mercury Drop Electrode SOV/20-128-5-41/67

intensified with increasing concentration and length of the carbon chain. Experimental data indicate that the course of $\text{Fe}(\text{CN})_6^{3-}$ -reduction in principle does not differ from that of $\text{S}_2\text{O}_8^{2-}$ -reduction. Reduction curves were calculated in accordance with the Heyman-Bagotskiy theory (Fig 2); they represent the general form of experimental curves, but deviate by up to 20% with the range of the potentials -1.2 to -2.2. This is explained by the peculiar potential distribution in the double layer. There are 4 figures and 12 references, 8 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova
(Moscow State University imeni M. V. Lomonosov)

SUBMITTED: July 28, 1959

Card 4/4

5.4600

67270

SOV/20-129-4-41/68

~~5(4)~~

AUTHORS:

Frumkin, A. N., Academician, Damaskin, B. B.

TITLE:

The Adsorption Isothermal¹ Lines of the Tetrabutyl Ammonium¹
Cation on Mercury

PERIODICAL:

Doklady Akademii nauk SSSR, 1959, Vol 129, Nr 4, pp 862-865
(USSR)

ABSTRACT:

The authors investigated the dependence of the degree of occupation of a drop-shaped mercury electrode on the concentration of the cations of tetrabutyl ammonium (TBA). The experiments were made at low concentrations of the $[(C_4H_9)_4N]^+$ and a frequency of the alternating current of 10,000 cycles at which the disturbing influence of pseudocapacity becomes negligibly small (Ref 2). The adsorption isothermal lines represented in figure 1 at 25° and an electron potential of -1.1 v and -1.2 v show the S-shape expected according to reference 9. The isothermal lines were recorded 2.5 minutes after formation of a pure Hg surface. The authors mention that at this instant of time equilibrium had not yet been attained, but measurements after longer time intervals could not be made because of not

Card 1/3

67270

SOV/20-129-4-41/68

The Adsorption Isothermal Lines of the Tetrabutyl Ammonium Cation on Mercury

yet explained time-dependent capacity variations (due probably to slow chemical variations of the TBA). Figure 2 shows the capacity - potential diagram measured in $1 \text{ n KJ} + 10^{-5} \text{ n } [(\text{C}_4\text{H}_9)_4\text{N}]^+$ on the suspended drop ($t = 2.5 \text{ min}$) and on a drop electrode ($t = 4 \text{ sec}$). The quantity of adsorbed TBA-ions depends to a considerable extent on the time t elapsed after formation of a pure Hg surface. Figure 3 shows the dependence of the course taken by the adsorption isothermal line on the TBA-ion concentration for potentials of from -1.0 to -1.53 v . A calculation of the degree of occupation according to Il'kovich's equation showed nearly the same course of the isothermal lines as in the case of the experimentally determined curve in the case of the potential -1.0 v . With a negative potential the isothermal line approaches equilibrium. If the potential becomes even more negative, an abrupt change of the degree of occupation occurs as a result of strong interaction of the adsorbed TBA-ions which are, in addition, still bound by iodine. This was predicted in reference 10. The authors mention the calculated values of TBA-ion adsorption in dependence on the electrode

Card 2/3

67270

SOV/20-129-4-41/68

The Adsorption Isothermal Lines of the Tetrabutyl Ammonium Cation on Mercury

potential. For the potentials between -1.5 and -1.47 v the values agree well with experimental data. In the case of less negative potentials the experimental data, because adsorption is to a higher extent influenced by diffusion and because the dependence of the degree of occupation is more considerably influenced by diffusion and because the dependence of the degrees of occupation on concentration, was not determined under equilibrium conditions. There are 3 figures and 13 references, 6 of which are Soviet. 4

SUBMITTED: September 10, 1959

Card 3/3

FRUMKIN, A.N.

Concerning the article by A.Mituya and T.Obayashi "Disintegration
of the platinum anode in acid solutions." Zhur. fiz. khim. 34 no.4:
931 Ap 60. (MIRA 14:5)

(Electrodes, Platinum) (Mituya, A.)
(Obayashi, T.)

S/020/60/132/04/40/064
B004/B007

5. 4500(B)
5. 4600
AUTHORS: Kokoulina, D. V., Dolin, P. I., Frumkin, A. N., Academician

TITLE: The Effect of Radiation Upon the Potential of the Platinum
Electrode in a Sulfuric Acid Solution

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 132, No. 4,
pp.880-883

TEXT: V. I. Veselovskiy and Ts. I. Zalkind (Ref. 1) were the first to find that in the irradiation of an H_2SO_4 solution with nitrogen, a potential forms on the Pt electrode, which is close to the potential of the reversible hydrogen electrode. It was the aim of the present paper to explain the conditions under which the H potential and the potential close to 0.85 v form on the Pt electrode in irradiation, and to clarify the part played in this process by molecular and radical products. The experiments were carried out by X-ray irradiation. Two forms of glass cells (Fig. 1) were used. Cell I had a large gas space into which the hydrogen formed was able to escape, whereas in the narrow cell II the escaping of H_2 was

Card 1/4

The Effect of Radiation Upon the Potential of
the Platinum Electrode in a Sulfuric Acid
Solution

S/020/60/132/04/40/064
B004/B007

rendered difficult. During the experiment the solution could be changed by supplies from a storage vessel in which the solution was saturated with H_2 and N_2 . Several experiments were also made while the solution passed through a glass tube. Fig. 2 shows the dependence of the potential of the Pt electrode (P_{Pt}) on the duration of irradiation of different intensities. In solutions saturated with N_2 , P_{Pt} at first shifts towards the H potential, after which it assumes a constant value of about 0.85 v, irrespective of the irradiation intensity. The authors draw the conclusion that this P_{Pt} corresponds to the concentration of molecular H_2 formed by radiolysis, and substantiate this opinion by the following observations: 1) By interruption of the irradiation before the maximum negative potential has been attained, P_{Pt} at first shifts further towards the value of the H electrode, after which, according to whether cell I or II had been used, it assumes the value 0.85 v more quickly or more slowly. 2) The addition of an active radical acceptor (KBr) changes nothing in the dependence of P_{Pt} on the radiation dose. 3) During

Card 2/4

The Effect of Radiation Upon the Potential of
the Platinum Electrode in a Sulfuric Acid
Solution

S/020/60/132/04/40/064
B004/B007

irradiation in a flowing solution, no shifting towards negative values occurs. If, however, the passage is blocked, P_{Pt} changes in the same manner as in cell II (Fig. 2). 4) In cell II there is an increase to 0.85 v only in the case of a larger dose than in cell I, from which H_2 is able to escape. In full agreement with S. D. Levina and T. V. Kalish the authors arrive at the conclusion that atomic hydrogen plays no essential part in this process. The potential of 0.85 v corresponds to a stable state of the platinum electrode in an irradiated sulfuric acid solution. The shift of P_{Pt} in the positive direction was caused by the concentration of H_2O_2 in the solution (Fig. 4). The potential of the Pt electrode in 0.8 N H_2SO_4 is due to molecular products (H_2 and H_2O_2) forming in the solution during irradiation. Here, the radical products play no noticeable part. They are apparently for the greater part recombined in the solution and on the surface of the electrode. There are 4 figures and 7 references: 4 Soviet and 3 British.

Card 3/4

The Effect of Radiation Upon the Potential of
the Platinum Electrode in a Sulfuric Acid
Solution

S/020/60/132/04/40/064
B004/B007

ASSOCIATION: Institut elektrokhemii Akademii nauk SSSR (Institute of
Electrochemistry of the Academy of Sciences, USSR)

SUBMITTED: February 26, 1960

Card 4/4

NIKOLAYEVA-FEDOROVICH, N.V.; FRUMKIN, A.N., akademik

Reduction of complex cobaltamines having negative substituents in
their inner coordination sphere on a dropping mercury electrode.
Dokl. AN SSSR 134 no.5:1135-1137 0 '60. (MIRA 13:10)

1. Moskovskiy gosudarstvennyy universitet im. M.V.Lomonosova.
(Cobalt compounds) (Electrodes, Dropping mercury)

S/020/61/136/005/030/032
B004/B058

AUTHORS: Frumkin, A. N., Academician, Petriy, O. A., and
Nikolayeva-Pedorovich, N. V.

TITLE: The current - time curve for the reduction of anions on the
dropping electrode

PERIODICAL: Doklady Akademii nauk SSSR, v. 136, no. 5, 1961, 1158-1161

TEXT: While the curve for the current I as a function of time has been studied for reduction processes, the rate of which decreases during adsorption of neutral organic substances and organic cations (Refs. 1-3), such studies are lacking for those cases where the reaction rate increases rapidly with increasing adsorption of cations. Such cations are tetrabutyl ammonium (TBA), tetraamyl ammonium (TAA), tetrahexyl ammonium (THA), and La^{3+} . The curve $I = f(t)$ was studied here for the reduction of $\text{S}_2\text{O}_8^{2-}$ and $\text{Fe}(\text{CN})_6^{3-}$ on the dropping mercury electrode in the presence of TBA, THA, TAA, and La^{3+} , and also for the reduction of PtCl_4^{2-} in the presence of

Card 1/♦

S/020/61/136/005/030/032
B004/B058

The current - time curve for ...

TAA. Measurements were made with a UJ1A (TsLA) oscilloscope of the type 01. The values φ of the potentials are expressed in volts related to a standard calomel electrode. It was observed in 10^{-3} N $K_2S_2O_8$ + $5 \cdot 10^{-3}$ N Na_2SO_4 at $\varphi = -0.55$ (the limiting diffusion current I_d appearing) that I is proportional to $t^{1/6}$. Various concentrations of TBA were without effect on the course of the curve. At the potential minimum ($\varphi = -1.1$), I is proportional to $t^{2/3}$ and is therefore of kinetic nature. Fig. 1 shows $I = f(t)$ for various concentrations of TBA. Similar curves were obtained for the reduction of $S_2O_8^{2-}$ in the presence of TAA, THA, and La^{3+} . With the cations mentioned, the same results were also obtained for the reduction of 10^{-3} N $K_2Fe(CN)_6$. The appearance of the instantaneous maximum I_{inst} , which exceeds the value of I_d , is explained. The reduction of $S_2O_8^{2-}$ and $Fe(CN)_6^{3-}$ proceeds very slowly in the absence of the cation. The concentration of anions in the layer close to the

Card 2/6

S/020/61/136/005/030/032
B004/B058

The current - time curve for ...

electrode equals that in the volume of the solution. If a sufficient amount of cations has accumulated on the surface to accelerate the reaction, the anion concentration near the electrode still remains sufficiently high. The resulting reduction current exceeds I_d but drops quickly after consumption of the anions. In the case of PtCl_4^{2-} this effect was not observed

in the presence of TAA, because TAA accelerates the reduction of PtCl_4^{2-} much less than that of $\text{S}_2\text{O}_8^{2-}$. In this case, the increasing occupation of the electrode by cations has an inhibitory effect. The appearance of natural oscillations of the current was observed under certain conditions.

Fig. 22 shows $I = f(t)$ in $10^{-3} \text{ N K}_2\text{S}_2\text{O}_8 + 3 \cdot 10^{-5} \text{ N } [(\text{C}_4\text{H}_9)_4\text{N}]\text{I}$ at a cell voltage of $U = -1.29 \text{ v}$. Similar oscillations were observed in $10^{-3} \text{ N K}_3\text{Fe}(\text{CN})_6$, if a resistance $R = 47 \text{ kohm}$ ($U = -0.8 \text{ v}$) was connected in series to the cell. Fig. 23 shows natural oscillations in $10^{-3} \text{ N K}_2\text{PtCl}_4 + 3 \cdot 10^{-5} \text{ N } [(\text{C}_4\text{H}_9)_4\text{N}]\text{I}$ at $U = -1.09 \text{ v}$. At $U = -1.2 \text{ v}$,

Card 3/6

S/020/61/136/005/030/032
B004/B058

The current - time curve for ...

R = 30 kohm, current oscillations were observed in
 10^{-3} N K_2PtCl_4 + $5 \cdot 10^{-5}$ N $[(C_4H_9)_4N]I$ + 10^{-1} N Na_2SO_4 at various moments
of the existence of the drop (Fig. 2a). Frequency and amplitude of these
natural oscillations as a function of voltage agree with the results found
in Ref. 11, and are connected with various states of the layer close to
the electrode. The oscillations disappear when the resistance is reduced.
V. Volkova (Czechoslovakia) and G. M. Florianovich are mentioned.
There are 4 figures and 12 references: 8 Soviet-bloc and 5 non-Soviet-bloc.

ASSOCIATION: Kafedra elektrokhemii Moskovskogo gosudarstvennogo
universiteta im. M. V. Lomonosova (Department of Electro-
chemistry, Moscow State University imeni M. V. Lomonosov)

SUBMITTED: November 22, 1960

Card 4/6

FRUMKIN, A.N., akademik; PETRIY, O.A.; NIKOLAYEVA-FEDOROVICH, N.V.

Adsorption of hydrogen ions on a negatively charged mercury -
electrolyte interface. Dokl. AN SSSR 137 no.4:896-899 Ap '61.
(MIRA 14:3)

1. Moskovskiy gosudarstvennyy universitet im. M.V. Lomonosova.
(Hydrogen) (Alkali metals) (Electrodes, Dropping mercury)
(Electric double layer)

DAMASKIN, B.B.; SHVARTS, Ye.; FRUMKIN, A.N., akademik

Curves of differential capacitance in $K_4Fe(CN)_6$ solutions. Dokl.
AN SSSR 140 no.3:630-633 S '61. (MIRA-14:9)

1. Moskovskiy gosudarstvennyy universitet im. M.V.Lomonosova.
(Potassium ferrocyanide--Electric properties)

KHILINOV, M., I.M.; KHILIN, I.O.; KHILIN, A.M., akademik

Polarographic catalytic surface waves of hydrogen are affected by the structure of the double layer. Dokl. Akad. Nauk SSSR 141 No.1:147-150 (1961). (14:11)

1. Institut elektrokhemii, SSSR.
(Hydrogen-ion concentration)
(Catalysis)
(Electrochemistry)

FRUMKIN, A.N., akademik; KORSHUNOV, V.N.; IOFA, Z.A.

Decomposition kinetics of alkali metal amalgams in buffer solutions. Dokl. AN SSSR 141 no.2:413-416 N '61. (MIRA 14:11)

1. Moskovskiy gosudarstvennyy universitet im. M.V.Lomonosova.
(Amalgams) (Electrochemistry)

FRUMKIN, A.N., akademik; KAGANOVICH, R.I.; BIT-POPOVA, E.S.

Adsorption of aromatic and hydroaromatic compounds at the
mercury - solution interface. Dokl. AN SSSR 141 no.3:670-673
N '61. (MIRA 14:11)

1. Moskovskiy gosudarstvennyy universitet im. M.V. Lomonosova.
(Aromatic compounds)
(Adsorption)
(Mercury)

FRUMKIN, A.N., akademik; SOBOL', V.V.

Measurement of the potential drop on a platinum anode after
the opening of a polarizing current circuit. Dokl. AN SSSR
141 no.4:917-920 D '61. (MIRA 14:11)

1. Moskovskiy gosudarstvennyy universitet im. M.V. Lomonosova.
(Electrodes, ~~Platinum~~)
(Electromotive force)

FRUNKIN, A.N. AND PETRIY, O.A.

"On the determination of the reacting particle charge and the constant α from the dependence of electroreduction kinetics on the potential and the concentration of the solution."

Report submitted to the Intl. Committee for Electrochemical thermodynamics
and Kinetics Rome, Italy 24-29 Sep 1962

FRUMKIN, A.N., akademik, otv. red.; RZHANOV, A.V., otv. red.; BURSHTEYN, R.Kh., doktor khim. nauk, otv. red.; YUNOVICH, A.E., red. izd-va; TIKHOMIROVA, S.G., tekhn. red.

[Surface characteristics of semiconductors] Poverkhnostnye svoistva poluprovodnikov. Moskva, Izd-vo Akad. nauk SSSR, 1962. 231 p. (MIRA 15:12)

1. Soveshchaniye po poverkhnostnym svoistvam poluprovodnikov, Moscow, 1961. 2. Chlen-korrespondent Akademii nauk SSSR (for Rzhanov). (Germanium--Electric properties) (Transistors)
(Selenium--Electric properties)

S/844/62/000/000/029/129
D244/D307

AUTHORS: Kokovlina, D. V., Dolin, P. I. and Frumkin, A. N.

TITLE: The influence of irradiation on the Pt electrode potential in sulfuric acid solutions

SOURCE: Trudy II Vsesoyuznogo soveshchaniya po radiatsionnoy khimii. Ed. by L. S. Polak. Moscow, Izd-vo AN SSSR, 1962, 176-182

TEXT: The conditions under which a smooth Pt electrode in 0.8 M H_2SO_4 assumes the hydrogen potential and a potential near to 0.85 v are described. The role played by radical and molecular radiolysis products on the establishment of a given potential after irradiation was also investigated. The irradiation was conducted by x rays, the solutions being placed in glass cells of three different designs. The maximum radiation doses applied were about 3×10^{17}

(cell I) and 7×10^{16} ev/cm³.sec (cells II and III). The Pt electrode potential in the solution saturated with N_2 decreases ini-

Card 1/2

The influence of ...

S/844/62/000/000/029/129
D244/D307

tially and reaches values near to that of the reversible hydrogen potential. This potential is not stable and increases with further irradiation to a value close to 0.85 v. The hydrogen potential is reached when the energy absorbed is $3 - 5 \times 10^{18}$ ev/cm³, irrespective of the total dose. It is concluded that the changes in the Pt electrode potential are determined by the accumulation of molecular radiolysis products (H₂ and H₂O₂) in the solution. The radical products are not important for the establishment of the Pt potential, most of them apparently recombining in the solution and on the electrode surface. There are 8 figures.

ASSOCIATION: Institut elektrokhemii AN SSSR (Institute of Electrochemistry, AS USSR)

Card 2/2

FRUMKIN, A.N.; SAT'YANARAYANA, S.; NIKOLAYEVA-FEDOROVICH, N.V.

Some new forms of polarographic maxima. Izv. AN SSSR. Otd. khim.
nauk no. 11: 1977-1984, N 162. (MIRA 15:12)

1. Institut elektrokhemii AN SSSR i Moskovskiy gosudarstvennyy
universitet im. M.V. Lomonosova.
(Polarography)

S/030/62/000/007/002/004
I048/I248

AUTHORS: Bagotskiy, V.S., Doctor of Technical Sciences, and
Frumkin, A.N., Academician

TITLE: The problem of direct conversion of chemical energy
into electrical [energy]

PERIODICAL: Akademi-nauk SSSR, Vestnik.³² no. 7, 1962, 19-32

TEXT: This reviews the history and the state of development
up to 1960 of fuel cells and other electrochemical current gene-
rators. Their operations are briefly discussed, the emphasis
being on weight vs. power output considerations. The use of fuel-
cells is preferred for long times of operation (20 hrs and over),
but conventional storage batteries (e.g., lead or Ag-Zn accumu-...

Card 1/2

S/030/62/000/007/002/004
I048/I248

The problem of direct....

lators) are superior for short-time uses. Although available fuel cells have a weight of 35-70 kg./kw. output, cells weighing 15-20 kg./kw. could be developed the lowest possible limit being 6-10 kg./kw. Future applications envisaged are in city transport, for military purposes (due to quietness and absence of smoke), and in artificial earth satellites and space rockets. A Scientific Council for Fuel Cells, associated with the USSR Academy of Sciences, has been set up in the USSR. The article is based mainly on Western Sources. There are 4 figures.

Card 2/2

SHVARTS, Ye.; DAMASKIN, B.B.; FRUMKIN, A.N.

Nature of the hump on the differential capacitance curves.
Zhur. fiz, khim. 36 no.11:2419-2427 N'62. (MIRA 17:5)

1. Moskovskiy gosudarstvennyy universitet imeni Lomonosova.

34482
S/020/62/142/004/019/022
B101/B110

26. 2513 (also 120P)
AUTHORS: Frumkin, A. N., Academician, Boguslavskiy, L. I. and
Serebrennikov, V. S.

TITLE: Electrode behavior of thermally treated polyacrylonitrile

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 142, no. 4, 1962. 878 - 880

TEXT: The electrode properties of thermally treated polyacrylonitrile (PAN) strands consisting of some hundred 2 - 3 μ thick filaments were compared with those of carbon obtained by carbonization of viscose. The potential as a function of log I was measured. An Hg₂Cl₂ electrode was used as reference electrode in alkaline solution, a normal sulfate electrode in acid solution. Results: in 1 N H₂SO₄ and H₂ atmosphere, the activity of PAN was much lower than that of carbon. In air, the activity of PAN in 1 N H₂SO₄ and 1 N NaOH was the same as that of carbon. All processes took an unsteady course on the polymer: potential and polarization increased at constant current. This nonstationary state could not be eliminated even by means of a rotary electrode. It is explained by

Card 1/3

S/020/62/142/004/019/022
B101/B110

Electrode behavior of thermally...

oxygen impoverishment of the solution in the micropores. It is assumed that the oxygen bound at first in the form of unstable peroxides is gradually bound irreversibly and more strongly. In oxygen atmosphere in 1 N NaOH, potentials of +280 to +285 v were observed, which were only 25 - 30 mv lower than the reversible potential of H_2O formation. A continuously changing activation energy ΔE of the conductivity was observed on filaments. It resulted therefrom that the potential in 1 N NaOH in the presence of air depended on ΔE . In spite of a strong spread of measured values, a minimum (0.04 v) was observed for $\Delta E \sim 0.32$ v and a maximum (0.14 v) for $\Delta E \sim 0.44$ v. This difference of about 100 mv corresponds to a change of the reaction rate by three orders of magnitude. The maximum catalytic activity may be connected with the specificity of organic catalysts in biosynthesis. ΔE was determined at the Institut poluprovodnikov AN SSSR (Institute of Semiconductors of the AS USSR) in the laboratory of L. S. Stil'bans, from the dependence of conductivity on $1/T$. Papers by A. V. Topchiyev, M. A. Geyderikh et al. (DAN, 128, 312 (1959)) and O. V. Krylov, S. Z. Roginskiy (DAN, 118, 523 (1958)) are mentioned. There are 4 figures and 5 references; 4 Soviet and 1 non-Soviet. The reference to the English-language publication reads as follows: J. O'M. Bockris, A. K. Shamshul Huq, Proc. Roy. Soc., A257, 277 (1956).

Card 2/3

Electrode behavior of thermally...

S/020/62/142/004/019/022
B101/B110

ASSOCIATION: Institut elektrokhimii Akademii nauk SSSR (Institute of Electrochemistry of the Academy of Sciences USSR). Institut neftekhimicheskogo sinteza Akademii nauk SSSR (Institute of Petrochemical Synthesis of the Academy of Sciences USSR)

SUBMITTED: October 31, 1961

X

Card 3/3

GOKHSHEYN, A.Ya.; FRUMKIN, A.N., akademik

Study of self-oscillations in passivation-free systems by means
of a solid electrode. Dokl.AN SSSR 144 no.4:821-824 Je '62.
(MIRA 15:5)

1. Institut elektrokhemii AN SSSR.
(Electrolyte solutions)

PETRIY, O.A.; FRUMKIN, A.N., akademik

Determination of the ~~4~~ constant from the dependence of electroreduction kinetics on the potential and on the background concentration. Dokl. AN SSSR 146 no. 5:1121-1124 0 '62. (MIRA 15:10)

1. Moskovskiy gosudarstvennyy universitet im. M.V. Lomonosova i
Institut elektrokhimii AN SSSR.
(Reduction, Electrolytic) (Electrochemistry)

FRUMKIN, A.N., akademik; PETRIY, O.A.

Determination of the charge of a reacting particle from the dependence of the electroreduction kinetics on the potential and concentration of a supporting electrolyte.
Dokl. AN SSSR 147 no.2:418-421 N '62. (MIRA 15:11)

1. Institut elektrokhemii AN SSSR i Moskovskiy gosudarstvennyy universitet imeni Lomonosova.
(Reduction, Electrolytic) (Electromotive force)

FRUMKIN, A. N., akademik; PETRIY, O. A.; NIKOLAYEVA-FEDOROVICH, N. V.

Electroreduction of anions and adsorption phenomena on a
dropping thallium amalgam electrode. Dokl. AN SSSR 147 no.4:
878-881 D '62. (MIRA 16:1)

1. Institut elektrokhemii AN SSSR i Moskovskiy gosudarstvennyy
universitet im. M. V. Lomonosova.

(Reduction, Electrolytic) (Adsorption)
(Electrodes, Thallium)

FRUMKIN, A. N.

"Influence of Adsorption of Neutral Molecules on the Kinetics of Electrode Processes."

Report presented at the 11th meeting CITCE, Intl. Comm. of Electrochemical Thermodynamics and Kinetics, Moscow, 19-25 Aug 63.

Institute of Electrochemistry, Academy of Sciences of U.S.S.R.; Moscow

FRUMKIN, A. N.; BAGOCKIH, V. Sz. [Bagotskiy, V. S.]

Direct conversion of chemical energy to electric power. Technika
7 no.3:2 Mr '63.

PONOMARENKO, Ye.A.; FRUMKIN, A.N.; BURSHTEYN, R.Kh.

Dependence of carbon electrode potential on the pH of a solution
under isoelectric conditions. Izv. AN SSSR. Ser.khim. no.9:
1549-1555 S '63. (MIRA 16:9)

1. Institut elektrokhemii AN SSSR.
(Electrodes, Carbon) (Electromotive force)
(Hydrogen-ion concentration)

FRUMKIN, A.N., akademik; LUKOVTSSEV, P.D., prof.

"Khimotronika", a companion of electronics. Nauka i zhizn' 30
no.6:12-15 Je '63. (MIRA 16:7)

1. Institut elektrokhemii AN SSSR.
(Electrochemistry, Industrial)

SHCHERBAKOV, D.I., akademik; FRUMKIN, A.N., akademik; KHACHATUROV, T.S.;
VINOGRADOV, A.P., akademik; SOBOLEV, S.L., akademik; KOSTENKO, M.P.,
akademik; TOLSTOV, S.P.; SAZHIN, N.P.; KAZARNOVSKIY, I.A.; VUL, B.M.;
TROFIMUK, A.A., akademik

Discussion of the annual report. Vest. AN SSSR 33 no.3:25-34
Mr '63. (MIRA 16:3)

1. Chleny-korrespondenty AN SSSR (for Khachaturov, Tolstov, Sazhin,
Kazarnovskiy, Vul).

(Academy of Sciences of the U.S.S.R.)

FRUMKIN, A.N.; GERASIMOV, Ya.I.; CHMUTOV, K.V.; TEMKIN, M.I.;
ZHUKHOVITSKIY, A.A.; TURKEL'TAUB, N.M.

Kirill Alekseevich Gol'bert. Zhur.fiz.khim. 37 no.1:249 Ja
'63. (MIRA 17:3)

FRUMKIN, A.N., akademik; PONOMARENKO, Ye.A.; BURSHEYN, R.Kh.

Chemisorption of oxygen and adsorption of electrolytes
on activated carbon. Dokl. AN SSSR 149 no.5:1123-1126 Ap '63.
(MIRA 16:5)

1. Institut elektrokhemii AN SSSR.
(Oxygen) (Electrolytes) (Adsorption)

FRUMKIN, A.N., akademik; PODLOVCHENKO, B.I.

Nature of platinum electrode potentials arising in ethanol solutions. Dokl. AN SSSR 150 no.2:349-352 My '63. (MIRA 16:5)

1. Moskovskiy gosudarstvennyy universitet im. M.V.Lomonosova.
(Electrodes, Platinum) (Ethanol) (Electromotive force)

FRUMKIN, A.N., akademik; DZHAPARIDZE, D.I.; TEDORADZE, G.A.

Catalytic evolution of hydrogen on mercury when a high proportion of the electrode surface is filled with the catalyst. Dokl. AN SSSR 152 no.1:164-167 S '63. (MIRA 16:9)

1. Institut elektrokhemii AN SSSR.
(Hydrogen) (Electrodes, Mercury) (Catalysis)

PODLOVCHENKO, B.I.; PETRIY, O.A.; FRUMKIN, A.N., akademik

Nature of the minimum observed on the potential displacement curves of a platinized platinum electrode when organic substances are introduced. Dokl. AN SSSR 153 no.2:379-382 N '63.
(MIRA 16:12)

FRUMKIN, A. N.; POLYANOVSKAYA, N. S.; GRIGOR'YEV, N.; BAGOTSKAYA, I. A.

"Electrocapillary phenomena on gallium."

report presented at 15th Mtg, Intl Comm of Electrochemical Thermodynamics & Kinetics, London & Cambridge, UK, 21-26 Sep 1964.

Inst of Electrochemistry, AS USSR.

ARTSIMOVICH, L.A., akademik; DOLLEZHAL', N.A., akademik; KIRILLIN, V.A., akad.;
MILLIONSHCHIKOV, M.D., akademik; POPKOV, V.I.; FRUMKIN, A.N.,
akademik

[Power engineering of the future; the second discussion]
Energetika budushchego; beseda vtoraiia. [By] L.A.
Artsimovich i dr. Moskva, Izd-vo "Znanie," 1964. 54 p.
(no oe v zhizni, nauke, tekhnike. Seria IX: Fizika, ma-
tematika, astronomiia, no.11) (MIRA 17:6)

1. Chlen-korrespondent AN SSSR (for Popkov).

SHELEPIN, I.V.; FRUMKIN, A.N., akademik; FEDOROVA, A.I.; VASINA, S.Ya.

Study of the double layer structure in the electrochemical
initiation of methyl methacrylate polymerization. Dokl. AN
SSSR 154 no.1:203-206. Ja '64. (MIRA 17:2)

1. Moskovskiy gosudarstvennyy universitet im. M.V. Lomonosova.

FRUMKIN, A.N., akademik; KUZNETSOV, V.A.; KAGANOVICH, R.I.

Adsorption of perfluorinated fatty acids at the interfaces
solution - air and solution - mercury. Dokl. AN SSSR 155
no.1:175-178 Mr '64. (MIRA 17:4)

L 16443-65 EXT(m)/EWP(t)/EWP(b) IJP(c) JD/JG
ACCESSION NR: AF4043555 S/0020/64/157/004/0957/0940

AUTHORS: Frumkin, A.N.; Academician; Grigor'yev, N.B.; Bagotskaya, I.A.

TITLE: Investigation of the structure of the electric double layer on gallium by the method of measuring differential capacity

SOURCE: AN SSSR. Doklady*, v. 157, no. 4, 1964, 957-960

TOPIC TAGS: electric double layer, gallium, differential capacity, gallium dissolution, charge density, water adsorption, dropping gallium electrode

ABSTRACT: The differential capacity on a dropping gallium electrode was measured at 30C in various Na_2SO_4 , NaClO_4 , LiCl , NaCl , KCl , CsCl , KI and KCNS solutions, 1N neutral salt solutions were used for measurements at potentials from -1.9 to -1.2 volts. For measurements from -1.3 to -1.1 volts the solutions were acidified to 0.01N, and for measurements from -1.15 volts to positive voltages they were acidified to 0.1N; except for KI and KCNS when HCl was used, the acid anions were the same as those of the salt; the total electrolyte concentrations were 1N. The electrode was prepared according to the description by A.N. Frumkin and A.V. Gorodetskaya (Zs. Phys. Chem.,

Card 1/5

L 16443-65

ACCESSION NR: AP4043555

136, 215 (1928)). At negative potentials corresponding to areas of cation adsorption, the differential capacity C increased in going from Li^+ to Cs^+ . In solutions containing the same cations but different anions the differential capacity curves almost coincided (fig. 1); C increased sharply at potentials corresponding to the start of anion adsorption in the following order $\text{CN}^- > \text{I}^- > \text{Br}^- > \text{Cl}^- > \text{SO}_4^{2-} > \text{ClO}_4^-$. The capacity was independent of frequency (318 cycles to 30 kilocycles/sec.) and was assumed to be the capacity of the electric double layer. The absence of dispersion of C indicated the process of Ga dissolution, which takes place at even more positive potentials, is irreversible. The relationship between the charge density ϵ and the potential φ for Ga and Hg in 1N solutions was compared (fig. 2). In the vicinity of the zero charge in 1N Na_2SO_4 $C_{\text{Ga}} = 135$ and $C_{\text{Hg}} = 29.5$ microfarad/cm². Further from the zero charge the rate increase in ϵ for Ga was reduced; it approached ϵ for Hg. Thus an electric double layer of the same state as on Hg was formed on Ga, only at a more positive potential with respect to the

Card 2/5

L 16443-65

ACCESSION NR: AP4043555

zero charge point. The increase in C on Ga at less negative values was attributed not to the adsorption of O or OH on the Ga surface, nor to an increase of Ga ions in the boundary layers, but to the adsorption of water on Ga, the water dipole being oriented with its negative end toward the Ga proportionally to the shift in Ga potential. "I thank B.B. Damaskin for participation in evaluating the obtained results." "Gallium was purified by the Institute of rare metals method. We take the opportunity to thank AN SSSR assoc. member N.P. Saghin for assistance in obtaining it." Orig. art. has: 3 figures.

ASSOCIATION: None

SUBMITTED: 31Mar64

ENCL: 02

SUB CODE: GC

NR REF SOV: 006

OTHER: 005

Card 3/5

L 16443-65
ACCESSION NR: AP4043555

ENCL: 01

0

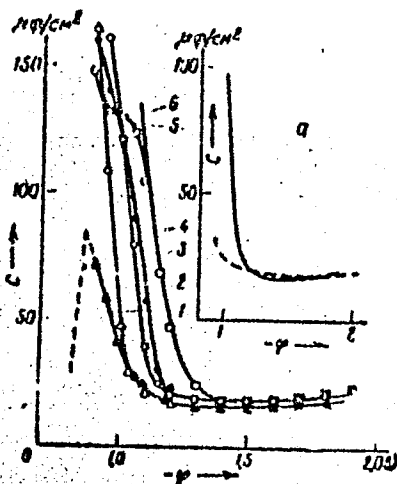


Figure 1

Curves of the differential capacity on gallium in 1N solutions:
1-- NaClO_4 , 2-- Na_2SO_4 , 3-- HCl , 4-- KBr , 5-- KI , 6-- KCNS . Fig. 1a:
dotted line --D.C. Gramme's data (Tr. IV. soveshch. po elektro-
khimii, No. 1958, str. 7) for 0.1N KCl; solid line--our data.

Card: 4/5

L 16443-65

ACCESSION NR: AP4043555

ENCL: 02

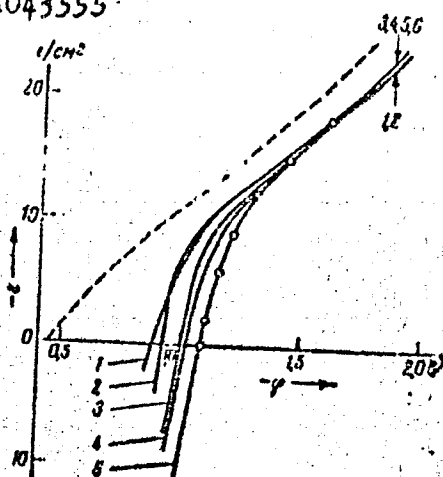


Figure 2

Relationship between charge density and potential on gallium in 1N solutions; 1-- NaClO_4 , 2-- Na_2SO_4 , 3-- KCl , 4-- KBr , 5-- KI , points on curve 5-- KCNS . Dotted line--curve for mercury on 1N Na_2SO_4 .

Card: 5/5

L 24806-65 EPF(c)/EPF(n)-2/ENG(j)/ENP(j)/EWA(h)/EWT(m)/EWA(1) Pc-4/Pr-4/Pu-4/Pe-4
 ACCESSION NR: AP4049925 GG/RM S/0020/64/159/003/0622/0625

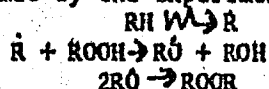
AUTHOR: Romantsev, M. F.; Sarayeva, V. V.; Bakh, N. A.; Frumkin, A. N.

TITLE: Mechanism of formation of dialkyl peroxides during radiation-induced oxidation of hydrocarbons (Academician)

SOURCE: AN SSSR. Doklady*, v. 159, no. 3, 1964, 622-625

TOPIC TAGS: hydrocarbon oxidation, radical oxidation, ionizing radiation, dialkyl peroxide, polarography

ABSTRACT: Thoroughly purified and dried isooctane (2,2,4-trimethylpentane) and n-heptane were exposed to x-rays (70 kV max.) and gamma rays (Co⁶⁰) at a dose rate of 2×10^{16} eV/ml·sec, and a temperature of 0°C, a steady stream of O₂ + N₂ mixtures of various compositions being bubbled through. The hydroperoxides were determined polarographically, the total peroxides were determined iodometrically, and the content of dialkyl peroxides was obtained by difference. Alcohols were determined colorimetrically as 2,4-dinitrophenyl-hydrazones. The proposed reaction mechanism, confirmed by the experimental data, is as follows:



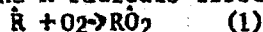
Card 1/2

L 24806-65

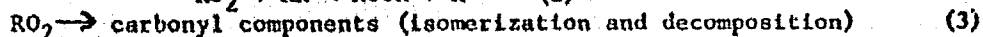
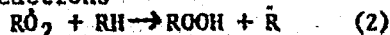
ACCESSION NR: AP4049925

2

In the presence of oxygen, the R radicals first form peroxide radicals



which then convert into hydroperoxides, carbonyl components, and alcohols, and the corresponding reactions



display no temperature dependence in the range under consideration. The data obtained indicate that most of the hydroperoxides, carbonyl compounds and alcohols formed preserve the carbon skeleton of the initial hydrocarbon, i.e., that the radical produced by the detachment of one hydrogen atom is chiefly used in the reactions. Only this radical has a sufficiently long lifetime to participate in reactions (1)-(3). Orig. art. has: 3 figures, 2 tables, and 6 equations.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. (Moscow State University); Institut elektrokhimii Akademii nauk SSSR (Institute of Electrochemistry, Academy of Sciences SSSR)

SUBMITTED: 07Jul64

ENCL: 00

SUB CODE: 00

NO REF SOV: 010

OTHER: 004

Card 2/2

FRUMKIN, A.N., akademik

Second seminar on electrochemistry in Czechoslovakia. Vest. AN SSSR
34 no.10:99-100 0 '64. (MIRA 17:11)

FRUMKIN, A.B., *author*; POLYAKOVSKAYA, N.S.; GOLITSYN, N.B.

Electrocapillary curves of liquid gallium. Dokl. Ak. Nauk SSSR 157
no.6:1455-1458 A. 1974. (1974, 12:9)

1. Moskovskiy gosudarstvennyy universitet im. Lomonosova.

L 25625-65 EPF(n)-2/EPA(s)-2/EWT(m)/EPA(bb)-2/EWP(b)/EWA(d)/EWP(t) Pt-10/
 Pu-4 IJP(c) WW/JD/JG/WB
 ACCESSION NR: AP4044890 S/0020/64/157/006/1455/1458 48
 37
 B

AUTHOR: Frumkin, A. N. (Academician); Polyanovskaya, N. S.; Grigor'yev, N. B.

TITLE: Electrocapillary curves of liquid gallium 27

SOURCE: AN SSSR. Doklady*, v. 157, no. 6, 1964, 1455-1458

TOPIC TAGS: gallium, electrocapillary curve, gallium purity, electrocapillary effect, capacitance, purity control

ABSTRACT: The electrocapillary effects and adsorption of surface active materials on pure gallium and the effect of the degree of purity on the electrocapillary properties of Ga were studied. The interfacial tension (σ) values obtained in various HCl-containing solutions in the potential interval from -0.8 to -1.8 v (φ) indicated the absence of effects of hydroxyl and hydrogen adsorption at the anode and cathode ends of each curve. The experimental electrocapillary curves compared with the σ - φ curves calculated by double integration from differential capacitance (C)- φ data. From the zero charge potentials (φ_0) and σ_{\max} values of Ga in different solutions it was found that the surface activity of SO_4^{2-} (or HSO_4^-)
 Card 1/2

L 25625-65

ACCESSION NR: AP4044890

3

Cl^- , Br^- , I^- decreased in this same order as in Hg. The surface activity of SO_4^{2-} was greater than, and of Cl^- and Br^- was similar to that on Hg; ClO_4^- had no effect. The high capacitance of the electric double layer of Ga at not too negative potentials and the asymmetry of the electrocapillary curves was believed to be determined by the chemisorption of water molecules, whose orientation changed with polarization of the metal. The purity of Ga had a strong effect on the electrocapillary curves; σ_{max} was 41 dyne/cm higher for 99.9998% pure Ga than for the 99.996%, and the σ shifted to more negative values. The possibility of controlling Ga purity by electrocapillary data was suggested. "We acknowledge B. B. Damaskin's participation in evaluating the results." "We thank AN SSSR associated member N. S. Sazhin for assistance in obtaining samples of this gallium." Orig. art. has: 3 figures and 1 table

ASSOCIATION: Moskovskiy gosudarvennyy universitet im. M. V. Lomonosova
(Moscow State University)

SUBMITTED: 12Mar64

NR REF SOV: 005

ENCL: 00

OTHER: 006

SUB CODE: GC, EM

Card 2/2

PAUN, L.; OPRESCU, Maria; DRAFTA, Denise; BĂȘTEANU, Melania; FRUNZA, S.

Aldosterone and the study of electrolytes in 10 cases of
a common clinical form of viral hepatitis. Stud. cercet.
endocr. 15 no.5:481-484 '64.

L 27406-65 EWT(m)/EPF(c)/EPR/EWP(j)/T Pc-4/Pr-4/Ps-4 RPL RM/WW

ACCESSION NR: AP5004595

S/0020/65/160/002/0349/0351

AUTHOR: Korshak, V. V.; Frunze, T. M.; Kurashev, V. V.; Baranov, Ye. L.

TITLE: Synthesis of graft copolymers of styrene with caprolactam

31
28
B

SOURCE: AN SSSR. Doklady, v. 160, no. 2, 1965, 349-351

TOPIC TAGS: graft copolymer, styrene copolymer, caprolactam copolymer, block copolymerization, methacryloylcaprolactam

ABSTRACT: The object of this study was to establish the optimum conditions (amount of the catalytic system and degree of conversion) for copolymers of different compositions in block copolymerization. To determine the amount of the catalytic system necessary and sufficient to prepare a copolymer with ϵ -caprolactam at a content of 2 to 50% of added styrene (or the number of imide groups in the copolymer of styrene with N-methacryloylcaprolactam (MAC)), the authors prepared copolymers containing from 0.9 to 10% of the imide component. Infrared spectroscopy was used to determine the number of imide groups. Assuming that the optimum amount of the catalytic system present during the polymerization of ϵ -caprolactam was 0.2 mole % of the latter, the authors found that, as the amount of

Card 1/2

L 27406-65

ACCESSION NR: AP5004595

styrene introduced into the graft copolymer increases, the number of imide groups present in the copolymer of styrene with MAC increases in proportion to $\tan \alpha$, α being the angle of the slope formed by the straight line representing the amount of the catalytic system versus the amount of styrene introduced. Orig. art. has: 2 figures and 1 table.

ASSOCIATION: Institut elementoorganicheskikh soedineniy Akademii nauk SSSR (Institute of Organoelemental Compounds, Academy of Sciences, SSSR)

SUBMITTED: 25Aug64

ENCL: 00

SUB CODE: OC, OC

NO REF SOV: 005

OTHER: 007

Card 2/2

FRUMKIN, A.N., akademik; IVANOVA, R.V.; DAMASKIN, B.B.

Adsorption by mercury of ions from concentrated aqueous
solutions of KCl and CsCl. Dokl. AN SSSR 157 no.5:1202-
1205 Ag '64. (MIRA 17:9)

FRUMKIN, A.N., akademik; DAMACKIN, B.B.; GEROVICH, V.M.; KACANDOVICH, R.I.

Adsorption potentials at the mercury - electrolyte interface as a function of adsorption of neutral molecules. Dokl. AN SSSR 158 no.3:706-709 S '64. (MIRA 17:10)

1. Moskovskiy gosudarstvennyy universitet im. M.V.Lomonosova.

DAMASKIN, Boris Borisovich; PETRIY, Oleg Aleksandrovich; FRUMKIN, A.N.,
akad., otv. red.

[Modern electrochemistry] Sovremennai elektrokhiimi.
Moskva, Nauka, 1965. 109 p. (MIRA 18:7)

FRUMKIN, A.N.; KHRUSHCHEVA, Ye.I.; TARASEVICH, M.R.; SHUMILOVA, N.A.

Use of the rotating disk electrode with a ring in conjunction with the method of triangular voltage pulses for studying electrode reactions. Elektrokhimiya 1 no.1:17-19 Ja '65. (MIRA 18:5)

1. Institut elektrokhemii AN SSSR.

VASIL'YEV, Boris Vasil'yevich, kand. khim. nauk; PSHENICHNIKOV,
Aleksandr Georgiyevich, kand. khim. nauk; FRUMKIN, A.N.,
akademik, red.; MEL'NIKOVA, Zh.M.' red.

[Horizons of electrochemistry] Gorizonty elektrokhimii.
Moskva, Znanie, 1965. 42 p. (Novoe v zhizni, nauke, tekhnike. XI Seriya: Khimiya, no.4) (MIRA 18:4)

FRUMKIN, A.N.

Point of zero charge in the equations of electrochemical kinetics.
Elektrokhimiia 1 no.4:394-402 Ap '65. (MIRA 18:6)

1. Institut elektrokhemii AN SSSR.

POLYANOVSKAIA, N.S.; FRANKIN, A.N.

Electrocapillary curves of indium amalgam. Elektrokhimiya
no.5:538-545 1965. (MIRA 1966)

1. Moskovskiy gosudarstvennyy universitet imeni Lomonosova.

FRUMKIN, A.N.; FEGOROV, V.I., 1955

Zinovii Aleksandrovich Iofa; on his 70th birthday, 1895-
Elektrokhimiia 1 no.5:620-621 My '65. (MIRA 18:6)

FRUMKIN, A.N.; DAMASKIN, B.B.; SURVILA, A.A.

Structure of the interface between an electrode and an aqueous electrolyte solution in the presence of an organic substance being adsorbed. Elektrokhimiia 1 no.6:738-742 Je '65. (MIRA 18:7)

1. Institut elektrokhemii AN SSSR.

FRUMKIN, A.N., akademik; SHUMILOVA, N.A., kand. khim. nauk;
CHIZMADZHEV, Yu.A., kand. fiziko-matem. nauk

15th Conference of the International Committee of Electrochemical
Thermodynamics and Kinetics held in London. Vest. AN SSSR 35 no.4:
85 Ap '65. (MIRA 18:6)

L 62998-65 ENG(j)/ENP(u)/EPA(s)-2/ENT(m)/EPF(c)/ENP(1)/ENP(j)/ENP(b)/
 ENA(h)/ENA(1) WW/JT/RM/WH
 ACCESSION NR: AP5015696 UR/0076/65/039/006/1538/1539

AUTHOR: Semenov, N. N.; Frumkin, A. N.; Dolin, P.I.

TITLE: Natal'ya Alekseyevna Bakh

SOURCE: Zhurnal fizicheskoy khimii, v. 39, no. 6, 1965, 1538-1539

TOPIC TAGS: physical chemistry, chemical personnel

ABSTRACT: Natal'ya Alekseyevna Bakh, the well-known physical chemist, was 70 years old on 1 May 1965. Miss Bakh is the daughter of A. N. Bakh, who founded the theory of oxidizing processes. She was born and educated in Switzerland. In 1920, she graduated from the University of Geneva (Department of Physical Mathematics) and went to the Soviet Union, where she started work as one of the first workers of the Physicochemical Institute im. L. Ya. Karpov (then the Central Chemical Laboratory of VSNKh). Her first work in the A. N. Bakh Laboratory was devoted to studying the effect of ferments and the toxic effect of catalysts. At the same time she was working on a method for obtaining dithionites and their derivatives.

Card 1/6

L 62998-65

ACCESSION NR: AP5015696

In 1927, Miss Bakh began investigating electrokinetic processes in the Surface Phenomena Section of the Physicochemical Institute. The connection between colloidal and electrochemical aspects of a number of systems was determined in these investigations. Positively and negatively charged platinum hydrosols were obtained for the first time. The result of this work was the subject of her doctoral dissertation. Parallel with this, she studied the activation mechanism of carbon and the high temperature oxidation of graphite. In 1938, she began studying the reaction mechanism of graphite and carbon black in a Leclanché cell. This helped industry considerably in changing from imported to domestic carbon black.

In 1941, Miss Bakh began working within the system of the Academy of Sciences USSR, that is, in the Colloidal-Electrochemical Institute, the Institute of Physical Chemistry, and the Institute of Electrochemistry. During

Card 2/6

L 62998-65

ACCESSION NR: AP5015696

the war she headed work on defense projects for which she was awarded the Order of the "Red Star". After the war she headed research in a new direction. Under her leadership the first systematic work in the USSR was started on the chemical reaction of ionizing radiation. This was the start of the emergence of radiation chemistry in the USSR. The research of N. A. Bakh and her coworkers contributed greatly to the development of this science. Initial efforts concerned the radiolysis of aqueous solutions and organic compounds. These investigations were developed further into separate divisions: radiation chemistry of water and aqueous solutions, radiative oxidation, and radiolysis of organic compounds.

Investigations of aqueous solutions, conducted on sample solutions of oxygen-containing anions, led to elucidation of patterns of radiative conversions and shed light on the mechanism for the formation of molecular products from the radiolysis of water.

Card 3/6

L 62998-65

ACCESSION NR: AP5015696

Miss Bakh's work on radiative oxidation and radiolysis of organic compounds has made it possible to determine the basic patterns of these processes. The nature of the radiative effect was elucidated in various temperature ranges during oxidation of a wide range of compounds. It was determined that early stages of radiative oxidation led to the formation of an unstable complex of oxygen with radicals which decomposes on the removal of oxygen, and to stable oxidation products in the presence of oxygen. Determination of both of these patterns is opening the way for radiative control of oxidation processes.

Basic investigations making possible industrial recommendations were conducted on the radiolysis and radiative oxidation of solvents and extracting agents. Work on industrial radiation modification of polymers conducted under the leadership of Miss Bakh for the past several years has led to the creation of materials which possess valuable semiconductor properties.

Card 4/6

L 62998-65

ACCESSION NR: AP5015696

4.
Miss Bakh was the first to organize training of specialists on radiation chemistry in the USSR. Since 1950, she has been a full professor of radiation chemistry at Moscow State University. Two doctoral and 17 candidate dissertations were prepared and defended under her guidance.

She plays an important role in organizing scientific investigations on radiation chemistry. For many years she performed work for the Commission for the Use of Isotopes and Radiation in Science and the National Economy. She was the organizer of the First and Second All-Union Conferences on Radiation Chemistry and presently is heading the section on radiation chemistry of the Scientific Council on the Chemistry of High Energy Particles, Academy of Sciences USSR. Miss Bakh has often represented Soviet science at foreign conventions and conferences. For her great service she has been awarded three orders and a medal of the Soviet Union. She is presently continuing further creative work.

Card 5/6

L 62998-65

ACCESSION NR: AP5015696

0

ASSOCIATION: none

SUBMITTED: 00

ENCL: 00

SUB CODE: GC

NE REF SOV: 000

OTHER: 000

FSB v. 1, no. 9

hick
Card 6/6

FRUMKIN, A.N.; SHUMILOVA, N.A.; KABANOV, B.N.; LEVINA, S.D.

Revekka Khaimovna Burshtein; on her sixtieth birthday. Zhur.
fiz. khim. 38 no.5:1390-1391 My '64.

(MIRA 18:12)

FRUMKIN, A.N.

Equations of electrochemical kinetics in the case of the metal
cation discharge involving the formation of a solution in another
metal. *Elektrokhimiia* 1 no.10:1288-1290 0 '65.

(MIRA 18:10)

1. Institut elektrokhimii AN SSSR.

IVANOV, V.F.; DAMASKIN, B.B.; FRUMKIN, A.N.; IVASHCHENKO, A.A.; PESHKOVA, N.I.

Differential capacity curves of a mercury electrode at high
electrolyte concentrations. Elektrokhimiya 1 no.3:279-282
Mr '65. (MIRA 18:12)

1. Moskovskiy gosudarstvennyy universitet i Tul'skiy
mekhanicheskiy institut.

SEMENOV, N.N.; FRUMKIN, A.N.; DOLIN, P.I.

Natal'ia Alekseevna Bakh, 1895-; on her seventieth birthday
and forty-fifth anniversary of scientific activity. Zhur.
fiz. khim. 39 no.6:1538-1539 Je '65. (MIRA 18:11)

KARP. S.F.; FRUMKIN, A.P.

Efficient method of producing ferroaluminum. Stal' 22 no.3:242
Mr '62. (MIRA 15:3)

1. Institut chernoy metallurgii AN USSR i zavod im. Karla
Libknekhta.

(Iron-aluminum alloys---Metallurgy)

FRUMKIN, A.P.

Compressed disks for heating ingots. Biul. tekhn.-ekon. inform.
Gos. nauch.-issl. inst. nauch. i tekhn. inform. 17 no.2:4-5
'64. (MIRA 17:6)

FRUMKIN, A. P.

DECEASED
c. '63

1963/
4

Surgery

LAPITSKIY, V. I.; KONOVALOV, V. S.; KIRSANOV, V. M.; BUGRIYENKO, V. A.;
Prinimali uchastiye: LEGKOSTUP, O. I.; PATLAN', Ye. F.;
LAYKO, B. G.; FRUMKIN, A. P.; GONCHAROV, G. P.

Use of graphite as packing material in the bottom pouring of
killed steel. Izv. vys. ucheb. zav.; chern. met. 5 no.12:56-60
'62. (MIRA 16:1)

1. Dnepropetrovskiy metallurgicheskiy institut.

(Steel ingots) (Graphite)